Journal of Air Law and Commerce

Volume 23 | Issue 3 Article 4

1956

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LEGAL PROBLEMS OF UPPER SPACE

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[Reprinted from the Proceedings of the American Society of International Law, 1956, pp. 85-93.]

TODAY neither lawyers nor governments are prepared to state the legal flight rules applicable to presently operating rockets and planned satellites. For the second time in the present century science and engineers have far outstripped the law. Such delay may be normal where legal rules must depend on known and accepted factual situations, but the gap between technological and legal progress must never be permitted to become too wide.

The present problem confronting us is this: Flight *instrumentalities,* such as rockets, satellites and other spacecraft do not fall within existing national or international regulatory provisions. Nor is there any agreement as to what, if any, national or international regulation is applicable to *space* above the atmosphere where such rockets and satellites will normally be used. This existing legal hiatus can lead to grave international misunderstanding if permitted to continue too long.

Flight technology first outdistanced the law in the early years of the present century when it became necessary to determine whether aircraft and balloons were vehicles like automobiles or whether they had nationality like ships; also, whether the atmosphere space in which they operated was or was not part of the territory of the subjacent state. The manner in which these questions were settled reveals the extent of the dangerous legal hiatus which now confronts us.

Flight became a factor in international affairs when it could be controlled by man. The airship flights of von Zeppelin between 1900 and 1902, and the airplane flight of the Wright brothers in 1903, were the real beginning. But governments were slow to fix the legal rules, and jurists were not in agreement. In 1906, in the much-discussed debates in the Institute of International Law, Fauchille urged freedom of flight and Westlake insisted upon national airspace sovereignty. But the importance of this discussion has, in my judgment, been exaggerated. It had little, if any, influence on the subsequent activities of states. Fauchille ignored the fact that distinguished jurists had long insisted that territory must be three dimensional. Westlake, while supporting sovereignty, appeared to believe that such sovereignty should be subject to an international right of innocent passage through the airspace, although no state ever accepted this dictum in practice.

Governments did not become really concerned until France, in 1908 and 1909, took alarm at the number of German balloons which were

drifting into France, many apparently manned by military personnel, and called the celebrated 1910 International Air Navigation Conference. This met in Paris to consider the possible regulations of international flight. The United States was not invited, as it was considered too far away to be affected. On more than one occasion I have stated my view that the proceedings of this 1910 Paris Conference, with its almost completed draft convention, indicated general agreement that each state had full sovereignty in then usable space over its national lands and waters, that no general right of international transit existed for aircraft of other states in the absence of international convention, and that the only practical legal method of regulating international flight was by agreement which would provide for the grant of privileges of flight through such national space.

By legislative acts and diplomatic conduct in the intervening years between the 1910 Conference and the outbreak of World War I, Europe indicated acceptance of these principles. Events at the outbreak of World War I and during that war, as well as the preparation and signature of the Paris Convention of 1919, gave further evidence of the validity of the principle of absolute sovereignty of the subjacent state over the "air space," and also of the fact that aircraft have nationality.

The Paris 1919 Convention was signed and ratified in French and Italian as well as in English. The words "air space" appear in the French version as *"espace atmosphérique"* and in the Italian as *"spazio atmosferico."* It seems apparent from this that the words "air space" in the English version meant, without question, "atmospheric space."

In many articles of the convention, the flight instrumentalities to be regulated are described as "aircraft," and their nationality is recognized. Under the system of the Paris Convention, its subsequently adopted annexes became part of the convention itself. In these annexes an "aircraft" is defined as follows: "The word 'aircraft' shall comprise all machines which can derive support in the atmosphere from reactions of the air." In Annex A various classes of "aircraft" included balloons, airships, land planes, sea planes and helicopters.

Taking together the assertion of state sovereignty in Article I, with this definition of "aircraft," it may be said that the Paris Convention declared that each state was sovereign in those areas of space where sufficient gaseous atmosphere existed to lift and support balloons, airships, and airplanes, as well as other types of flight instrumentalities which could "derive support in the atmosphere from reactions of the air." Man had not yet conceived the possibility of any other type of flight instrumentality, nor had he had occasion to regulate areas of space other than those used by "aircraft."

In 1926, by the adoption of the Air Commerce Act, the United States (which signed but did not ratify the Paris Convention) declared itself to possess complete and exclusive national sovereignty in the

airspace over the United States, and defined aircraft to mean "any contrivance now known or hereafter invented, used or designed for navigation or flight in the air." These rules were carried forward in the Civil Aeronautics Act of 1938, and are still part of our law. It is conceivable that this definition of aircraft is broader than the Paris definition, as it seems to include flight instrumentalities used for flight in the air even though not supported thereby.

The Chicago Convention of 1944, to which most of the states engaged in international aviation are parties, except the U.S.S.R., restated in Article I the provisions of the Paris Convention as to airspace sovereignty in this manner: "The contracting States recognize that every State has complete and exclusive sovereignty of the airspace above its territory." Again, as in the Paris Convention, this is a statement of customary international law and not an exchange of privileges between the states concerned. Also, the Chicago Convention deals with the regulation of "aircraft" which are given the attribute of nationality. But neither "airspace" nor "aircraft" is defined.

Under the Chicago Convention the technical standards, called annexes, do not become parts of the convention. They are prepared by the International Civil Aviation Organization, and are then submitted to the member states for acceptance. Any state finding it impractical to comply in all respects with such standards must so advise the International Civil Aviation Organization.

During the Chicago Conference, the United States submitted suggestions for future annexes, including the definition of aircraft similar to that in the Air Commerce Act of 1926 as stated above. But the Chicago Conference inserted in the tentative annexes the definition of aircraft as it had already existed in its narrower form in the Paris Convention annex. Subsequently, the International Civil Aviation Organization, when formally adopting the present Annex 7 dealing with Aircraft Nationality and Registration Marks, defined aircraft as "any machine that can derive support in the atmosphere from the reactions of the air." This is almost exactly the Paris definition adopted many years earlier. In the same annex, the term "aircraft" is stated to include balloons, airships, airplanes and helicopters, and other similar instrumentalities requiring support in the atmosphere from reactions of the air in order to maintain flight.

When this annex was submitted to the member states of the International Civil Aviation Organization, no objection was apparently raised by the United States or any other member state, and it may therefore be that this is the definition which the United States must apply in international use rather than its own definition. This, however, is a problem which has not yet arisen, but which may become acute if a type of flight instrumentality is launched by the United States, which is covered by our own definition of "aircraft," but is not included in the international definition adopted pursuant to the Chicago Convention.

From the foregoing the following appears to be the present *legal* situation:

(a) Both the Paris and Chicago conventions have dealt only with those flight instrumentalities which derive support in the atmosphere from reactions of the air, such as the balloon or airplane, and have not dealt with such instrumentalities as rockets, satellites, and other space craft which are designed to move through space without atmospheric support.

(b) The Chicago Convention contains no definition of "airspace" but it may well be argued that, as it was adapted from the Paris Convention, it deals with no areas of space other than those parts of the atmosphere where the gaseous air is sufficiently dense to support balloons and airplanes. The highest flight by any unmanned balloon up to the present time is 140,000 feet, by a manned balloon 72,395 feet, and the highest airplane flight is 90,000 feet.

(c) Nothing in the Chicago Convention precludes the possibility of state sovereignty being extended by international agreement, or by unilateral force, above the areas in which the airplane and balloon can be used, but there is certainly no basis on which any customary international law can as yet be considered applicable to such higher areas.

(d) Airspace over the high seas is now free for use by all.

The present *technical* situation is also of major importance. Basing my information solely upon public disclosure in the press and the current literature, I would invite your attention to the following:

(a) Rockets of the so-called V-2 type, as used in the German attacks on London, are understood to have been driven to a height of about 114 miles. An American rocket, which consisted of a V-2 plus an additional rocket stage, has been publicly stated to have reached an altitude of about 250 miles.

(b) It now appears that there is an area between the highest possible balloon flight—let us say, 30 miles above the surface of the earth—and 200 to 300 miles above the surface of the earth, in which continuous or extended satellite flights may be extremely difficult due to the presence of sufficient atmosphere to create serious "drag" or heating.

(c) In other words, it is now suggested that the future satellite flight will be most practical for long distances only if conducted not less than 200 or 300 miles above the surface of the earth.

In July, 1955, the United States announced that it would support a series of satellite flights as part of the wide scientific investigation of the 1957-1958 International Geophysical Year. Some of the details of the proposed flights have now been disclosed. It is planned to drive a

three-stage rocket at least 200 miles above the surface of the earth, carrying in its nose the "satellite," which will be a round object about the size of a basketball. The directions of the various stages of the rocket will be so changed that when the satellite is discharged and starts on its free orbit it should be approximately parallel to the surface of the earth. Based on the much-discussed principle that if the speed of the rocket at that point is sufficient to counterbalance the attraction of the earth, the satellite should continue on an orbit around the earth for several days or even for several weeks, the time being dependent, among other things, on the amount of atmospheric "drag." The satellite will carry in its small bulk an amazing collection of instruments for obtaining information deemed by the scientists to be of the greatest possible future value. The International Geophysical Year, of which this satellite program is part, is directed by committees made up of scientists of many different nations. But the satellite itself will be launched by the United States Government.

Two authorities have already dealt with the legal problems of this flight. Mr. Andrew G. Haley, General Counsel of the American Rocket Society, presented a paper at the annual meeting of that Society in November, 1955, in which he seemed to suggest that the areas of space above the atmosphere to be used by the satellite might be subject to some sovereign control of the subjacent states, but that failure of any state to object to the International Geophysical Year satellite program at the time of its announcement was all that was required in order to make the completion of the program possible. He added that "The Scientists have benefited mankind as a whole in a field where the lawyers might well have failed."

Quite a different thesis has been put forward by Mr. C. Wilfred Jenks, an Associate of the Institute of International Law.[1] In his article Mr. Jenks noted the announcement by the White House of a satellite program "to circle the earth in 90 minutes at a height of 300 miles." His legal position is, apparently, that space beyond the atmosphere of the earth is and must always be incapable of appropriation by the projection into such space of any particular sovereignty based on a fraction of the earth's surface. He argues that the acceptance of such complete international freedom in these areas of space is required by astronomical and physical facts, and he contends that the only activities "within the atmosphere of the earth would appear to be susceptible of the degree of control similar in general nature to that which can be exercised in territorial waters or over a wider maritime frontier belt." It would therefore appear that Mr. Jenks denies the existence or possibility of national sovereignty in areas of space beyond the atmosphere—say from 300 miles above the earth's surface upward. He continues:

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[1] "International Law and Activities in Space," 5 International and Comparative Law Quarterly 99-114 (January, 1956).

> It would seem important to accept this principle fully from the earliest stages of the exploitation and exploration of space, and it is of interest that the United States plan for launching space satellites appears to be based upon it. There is no indication in the United States plan that it is proposed to negotiate passage agreements with the subjacent sovereignties. Moreover, such rights cannot be claimed under the International Civil Aviation Convention, since, even assuming the Convention to be applicable beyond the atmosphere and disregarding the fact that certain States, including the U.S.S.R., are not parties to it, the Convention provides that pilotless aircraft will not be flown over the territory of contracting States without special authorization.

The statements by Mr. Haley and Mr. Jenks point up the importance of the problem to be considered—namely, What is the legal status of the space beyond the atmosphere where rockets and satellites can be operated without undue atmospheric interference?

A subsidiary question involves the status of the intermediate area between the upper level of the atmosphere used by aircraft and the lowest height at which a rocket or satellite may freely be operated. I am not sure that we yet have the scientific data necessary to determine the extent to which rockets or satellites may safely use this intermediate area. At least I do not feel that sufficient data is publicly available.

Five years ago, in what may have been the earliest present-day discussion of the question of the legal status of space at high altitudes,[2] I suggested that the time had come when "we must agree that there is an upper boundary in space to the territory of the subjacent State," and I said:

> Certain jurists have insisted that the territory of a State is limited by the ability of that State to make its law effective. This is a harsh rule when applied to sovereignty in space. The richest and most powerful States now have means through high altitude rockets to control more or less effectively the "airspace" over their surface territories. But the weaker States have no such power. Can we be said to live in such a world where the physical power at any one time of any particular State determines its international right to consider the region above its surface territories as part of its national territory? I may say here that my own belief is and has always been that if the rule of effectiveness is to be applied to determine the limit of State territory in space, then the rule should be that every State, no matter how small or how weak, as a State of equal sovereignty with every other State, has and should be admitted to have territorial rights upwards above its surface territories as high as the rights of every other State no matter how powerful.

At the same time I indicated that this left open such questions as the extent of contemplated control, and the means by which an international determination could be made of the ability of the most powerful state to extend its control into outer space. Long and careful consideration during the past five years has convinced me of the exist-

[2] "High Altitude Flight and National Sovereignty," 4 International and Comparative Law Quarterly 411-418 (1951).

ence of almost insuperable difficulties in applying the rule which I then suggested. The only practical way to solve the questions as to the legal status of areas above those covered by a strict construction of Article I of the Chicago Convention will be the adoption of some form of international agreement.

Such a new convention might include these solutions:

(a) Reaffirm Article I of the Chicago Convention, giving the subjacent state full sovereignty in the areas of atmospheric space above it, up to the height where "aircraft" as now defined, may be operated, such areas to be designated "territorial space."

(b) Extend the sovereignty of the subjacent state upward to 300 miles above the earth's surface, designating this second area as "contiguous space," and provide for a right of transit through this zone for all non-military flight instrumentalities when ascending or descending.

(c) Accept the principle that all space above "contiguous space" is free for the passage of all instrumentalities.

These solutions would aid future peaceful use of rockets and satellites and would seem to provide reasonable security for the subjacent state. At the same time, the territory of the state would be extended upward even beyond the areas in which it might make its normal laws effective. For I venture to suggest that, due in part to the physical problems involved, in part to the enormous speeds of the flight instrumentalities concerned, as well as many other difficulties, it will be most unlikely that any state can make its normal day-by-day laws effective very high in space. I do not deny the possibility that with modern weapons, such as guided missiles, a state may exercise *military command* quite high into space, provided it is certain that its activities are within the areas which are really above its own territory. But I must differentiate between such military control as may be involved in shooting down an intruder, and the normal civil control that a state must have day by day to enforce in its territory the peacetime laws under which men live together.

These ideas are put forward only as suggestions. The main problem is that an agreement would be most useful regarding the status of space above the "territorial space" covered by the Chicago Convention. As a word of caution, I would again suggest that we may not yet have the physical and scientific information needed to reach immediately the soundest decisions. The data being collected by the International Geophysical Year program will help tremendously. But it would be unfortunate if international rules of future high altitude flight control were adopted, and if it were then found that they were based on incorrect theories as to the physical characteristics and usefulness of various areas in the upper atmosphere and beyond.

At this point I wish to express my appreciation to my one-time colleague at the Institute of International Air Law, Mr. R. S. S. Allen of London, who under my direction has done a great deal of research in certain of the problems here discussed. It was Mr. Allen who first suggested to me the advisability of three zones, although the zones which are now indicated are not exactly those he had in mind.

Certain additional questions require consideration. If a new convention is not adopted, should the International Civil Aviation Organization amend its annexes so as to expand its definition of "aircraft" to include instrumentalities which, like rockets and satellites, were not contemplated at Chicago? It must be recalled that Article XII of the Chicago Convention already gives to the International Civil Aviation Organization the power to adopt flight rules as to the operation of aircraft when over the high seas. This article would have greater significance if "aircraft" included rockets and satellites when flying above the high seas.

Another problem to be dealt with is the difficult question of nationality. The whole theory of nationality, as derived from the law of the sea, is based on the concept that when a state gives to a ship the right to use its flag, such state assumes certain international responsibilities for the good conduct of that ship on the high seas and in foreign ports and at the same time acts as the protector of the ship to enforce its international rights. Under the Chicago Convention, aircraft are given the same characteristic of nationality. In addition, Article VIII deals with aircraft "capable of being flown without a pilot," and it would seem that such pilotless aircraft also have nationality. While the application of the rule of nationality to rockets and satellites may be difficult, nevertheless if upper space is to be free like the high seas, then certainly a state must be prepared to be responsible for the international good conduct of its rockets and satellites; otherwise chaos might result. Nationality must be considered when these new types of flight instrumentalities are brought within the sphere of international regulation.

Assuming that decisions are made as to the legal status of the various usable zones in space and as to the legal status of flight instrumentalities not now included in the international definition of "aircraft;" a further problem must be solved: Some jurists appear to doubt if the International Civil Aviation Organization, set up under the Chicago Convention, should be designated as the international body to regulate and control the use of all areas of space for non-military purposes, and indicate that the problems of future rocket and satellite flight in upper space are so interlinked with other international problems that some new world organization must be created to deal with the new questions involved. I am not yet convinced of the need for a new organization.

In summary, the purpose of this paper is to place before you certain basic problems. The solutions which I have tentatively suggested

may not be accepted, but I do urge that as soon as the physical characteristics of the upper atmosphere and space beyond are sufficiently known to warrant the adoption of acceptable rules, then an international conference be held to amend the Chicago Convention, or to adopt a new convention, so that all areas of space now usable, or which may become usable within a reasonable time, may be considered, and agreement reached as to the status of each. Agreement must also be reached as to how, and by whom, and under what circumstances, new instrumentalities of flight, such as rockets and satellites, will be regulated. It is certainly the duty of international lawyers to give these matters their earnest attention so as to be in position, when the time comes, to aid in reaching an international accord.